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BEFORE THE STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL

In the Matter of Application No. 99-1:

SUMAS ENERGY 2 GENERATION
FACILITY

**PRE-FILED TESTIMONY OF
PETER G. SAGERT**

ISSUE:

AIR QUALITY

SPONSOR:

City of Abbotsford
Abbotsford Chamber of Commerce

BRICKLIN & GENDLER,
LLP
ATTORNEYS-AT-LAW
SUITE 1015 FOURTH AND PIKE
BUILDING

1424 FOURTH AVENUE
SEATTLE, WA 98101
206.462.8868

EXHIBIT PGS -T

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BRICKLIN & GENDLER,
LLP
ATTORNEYS-AT-LAW
SUITE 1015 FOURTH AND PIKE
BUILDING
1424 FOURTH AVENUE
SEATTLE, WA 98101
(206) 462-1868

EXHIBIT PGS -T

1 **Would you please identify yourself?**

2

3 My name is Peter Sagert. I am the Principal of Cirrus Consultants located in
4 Vancouver, British Columbia. Cirrus provides environmental consulting services to
5 industry and government. Those services include environmental evaluation,
6 assessment and permitting with an emphasis on the air quality aspects of both existing
7 and proposed industrial facilities. I am skilled in performing emission and best
8 available control technology evaluations, environmental aspects of site selection,
9 cumulative impact assessments, meteorological and air quality evaluations, and other
10 issues related to the environmental aspects of project development and operation.

11 **Would you please summarize your experience and education relative to your work?**

12

13 I have a total of 30 years environmental experience as an environmental consultant,
14 working for an electric utility and the provincial government. That experience
15 involved addressing environmental issues of industrial facilities including thermal
16 power plants. In 1981, I formed Cirrus Consultants. Prior to that, I was Vice President
17 of Environmental Engineering for Envirocon, a Vancouver based consulting firm; air
18 management engineer for BC Hydro and Power Authority; and an environmental
19 engineer at the B.C. Pollution Control Branch (now the Ministry of Environment,
20 Lands and Parks). I also worked with a consulting firm, Acres, which conducted
21 environmental evaluations and hydroelectric engineering projects. I have addressed
22 over 300 environmental projects primarily in Canada but also in the United States and
23 overseas.

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1 I hold a Master of Science in Atmospheric Science from Colorado State University and
2 a Bachelor of Science in Mechanical Engineering from Queen=s University (Kingston,
3 Canada). I am a member of several professional organizations in Canada and the
4 United States and have taken additional training courses including prevention of
5 significant deterioration (PSD) and the application of best available control technology
6 (BACT). I have been a registered professional engineer in British Columbia since
7 1972.

8 My resume, including a list of significant investigations and studies is attached as
9 Exhibit PGS - 1.
10

11 **What assignment were you given with regard to the proposal for the Sumas Energy 2,**
12 **Inc. project?**

13
14 I was asked to evaluate the environmental aspects of the proposed Sumas Energy 2,
15 Inc. (SE2) project for the City of Abbotsford. (SE2 is used as the abbreviation for the
16 applicant and S2GF for the project). I also assisted the City of Abbotsford in the
17 preparation of their response to the draft Environmental Impact Statement (DEIS).
18 Following assessment of the relevant documents, I evaluated the environmental
19 significance of the proposed S2GF project to the City of Abbotsford, the Abbotsford
20 Chamber of Commerce, and the Fraser Valley Regional District (FVRD).

21 **What have your reviewed in relation to this assignment?**
22

23 In addition to the DEIS and the submission by the City of Abbotsford in response to
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1 that document, I also reviewed the relevant portions of the application for the S2GF
2 project dated January 2000 as well as relevant portions of the prior application and the
3 draft Environmental Impact Statement. In addition, where documents were made
4 available from the B.C. government with respect to the work of the interagency
5 evaluation committee on the proposed project, I considered that correspondence. Since
6 some of the correspondence from the applicant appeared to be issued outside of the
7 EFSEC distribution process, it was difficult to fully determine the final definition of
8 the project including proposed mitigative measures. While some other correspondence
9 may exist, I could only address the available information filed through EFSEC or
10 known to me by other means.

11 For example, the Sumas Energy 2, Inc. letter of May 24, 2000 to the B.C. Ministry of
12 Environment, Lands and Parks (MELP) addressed proposed mitigative measures for
13 the S2GF project, plans to evaluate the Sumas Abbotsford aquifer and plans to provide
14 information on an alternate effluent treatment system for S2GF. While that letter was
15 not provided directly to the City of Abbotsford, as a designated intervenor, it was
16 received by the City from the provincial government on June 16th.

17 In addition, I reviewed the documents and correspondence between the B.C. Ministry
18 of Environment, Lands and Parks (MELP) and Environment Canada and the
19 proponent. I reviewed other sections of the application as necessary to make certain
20 I understood the sections I was principally reviewing. I also drew upon our extensive
21 library of reports, text books and other documents pertaining to these types of issues.

22 I also drew upon my own personal experience having worked with many thermal
23 power and other industrial projects and having conducted prior evaluations on air

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EXHIBIT PGS -T

1 quality and the environment within the Lower Fraser Valley (LFV) and other areas.

2
3 I also reviewed information available on the internet and hard copy documents from
4 other government agencies including those of the South Coast Air Quality
5 Management District, the Bay Area Air Quality Management District, U.S.
6 Environmental Protection Agency, Environment Canada, B.C. Ministry of
7 Environment, Lands and Parks, Greater Vancouver Regional District and other
8 documents which I considered appropriate in preparation of this evidence.

9 **What conclusions did you reach regarding the adequacy of the information contained**
10 **in the application?**

11
12 There are problems with the application by SE2 to EFSEC to limit it=s value with
13 respect to the assessment of air quality effects from the proposed project on the
14 Canadian side of the border. The Lower Fraser Valley would frequently receive the air
15 emissions from the proposed project. The changing nature of this proposed S2GF
16 project, together with the limited evaluation in the application and the DEIS for the
17 portion of the airshed in the City of Abbotsford and the Fraser Valley Regional
18 District, limits the merits of the applicant=s assessment for that area. In particular,
19 effects of the proposed S2GF project incrementally or cumulatively on secondary
20 aerosols (fine particulate) formation, sensitive agricultural crops, public health, and
21 visibility need to be more carefully delineated as the current published documents do
22 not adequately address the effect of the emissions from the proposed project on those
23 areas.

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1 As a supplement to the application, the proponent has reasonably attempted to inform
2 the interagency environmental committee and their subsidiary Canadian agencies of
3 steps being taken by SE2 to evaluate air quality on the Canadian side of the Lower
4 Fraser Valley (LFV). However, the City of Abbotsford, as a designated intervenor,
5 should have been provided with the relevant correspondence directly to assist in the
6 review of the proposed project.

7 The obligation to both conduct and publish the reviews of air quality, visibility and the
8 effects of the proposed project on sensitive receptors (e.g., commercial agriculture) in
9 the City of Abbotsford and the Fraser Valley Regional District primarily rests with the
10 applicant, not the City of Abbotsford, the Abbotsford Chamber of Commerce or the
11 Fraser Valley Regional District.

12 In addition, the applicant did not confirm the specific air emission limits proposed by
13 the applicant from a permit compliance perspective. That step is necessary, before any
14 meaningful conclusions on allowable discharges can be stated. Currently, the
15 proponent needs to commit, in accordance with established U.S. Environmental
16 Protection Agency (U.S. EPA) procedures, that the proposed facility will comply with
17 permit type emission limits.

18 If SE2's application has provided a more balanced description of the Canadian side
19 of the border (Aonly a half mile from the project site@ as noted on p. 5.1-1 of the
20 application), then that greater sensitivity would likely have resulted in less of an
21 adverse reaction to the proposed project. Figures 5.1-1 to 5.1-3, 5.1-5 and 5.1-6
22 illustrate that point with the northern part of the figures ending at the 49th parallel.
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EXHIBIT PGS -T

1 **Does the draft EIS cure these deficiencies?**

2
3 No. The draft EIS (DEIS) is largely a summary of the application. As noted by the
4 City of Abbotsford, Environment Canada and the Ministry of Environment, Lands and
5 Parks, the DEIS contains additional deficiencies beyond those in the application. The
6 City of Abbotsford=s response to the DEIS is both reasonable and appropriate. As one
7 of the authors, I adopt the City=s letter of May 2, 2000 on the DEIS as part of my
8 evidence.

9 Because the DEIS relied on the application, there are, again, problems with the DEIS
10 to render it of limited value with respect to the assessment of air quality from the
11 proposed project on the Canadian side of the border. In addition, the assessments of
12 the S2GF project by the relevant Canadian government agencies are neither complete
13 nor have they been publicly released by the Ministry of Environment, Lands and Parks
14 (MELP) at the time of preparation of this evidence.

15 The Memoranda of Understanding between Washington State and the Province of
16 British Columbia require full consultation between the government agencies on a
17 proposed project. With a proposed project located immediately adjacent to the border,
18 it is appropriate that the Canadian agencies have a similar opportunity to that of the
19 Washington Department of Ecology to interpret the environmental effects of the
20 proposed project but in accordance with Canadian criteria. To date, that review and
21 analysis by the province of British Columbia, in association with Environment Canada
22 and the technical staff of the Greater Vancouver Regional District, is not complete.

23 In addition, that review should be consistent with those agencies= demands for
24 industrial projects/operations in the Canadian portion of the airshed.

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2 Environment Canada, MELP and the GVRD (technical advisors to the City of
3 Abbotsford and the Fraser Valley Regional District) have a responsibility to understand
4 the principles of prevention of significant deterioration (PSD). Canada made a
5 commitment in Annex I, Part 4 of *The Agreement between the Government of Canada*
6 *and the Government of the United States of America on Air Quality (the Air Quality*
7 *Accord)* (March 13, 1991) to develop and implement means affording levels of
8 prevention of significant air quality deterioration and protection of visibility
9 comparable to those required by Part C of Title 1 of the U.S. Clean Air Act, with
10 respect to sources that could cause significant transboundary air pollution. The
11 *Interagency Agreement Among the State of Washington, Department of Ecology and*
12 *the State of Washington, Northwest Air Pollution Authority and the Province of British*
13 *Columbia, Ministry of Environment, Lands and Parks and the Greater Vancouver*
14 *Regional District* recognized this commitment and the four agencies undertook to
15 provide prior-consultation on air permits which are deemed to have significant
16 potential for cross-border air quality impacts@.

17 While the Government of Canada has not issued formal PSD criteria, the applicant,
18 City of Abbotsford, Chamber of Commerce and the Fraser Valley Regional District are
19 all attempting to address potential environmental effects in Canada.

20 From prior established practice in British Columbia, the need for flexibility in terms
21 of evaluation of environmental effects goes beyond the Acookbook@ approach largely
22 used for PSD reviews in the United States. The lack of appropriate information in the
23 DEIS or the application renders these documents incomplete for that purpose.

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EXHIBIT PGS -T

1
2 Flexibility in a Canadian and Province of British Columbia context allows the
3 consideration of potential effects on public health and the environment at
4 concentrations below Canadian and U.S. air quality objectives or standards. That
5 approach is analogous to the use of air quality related values (AQRVs) for Class I areas
6 under PSD through the U.S. approach, but in this case, a different set of AQRVs
7 applicable to the equivalent of the Class II area of the Lower Fraser Valley need to be
8 considered. (A Class I area is typically a national park or wilderness area while Class
9 II would typically be the rest of the United States, like Whatcom County). The DEIS
10 effectively ignores Canada for that type of analysis. For example, school locations are
11 noted in both the DEIS and the application in the United States, but were not included
12 for those schools in the same range of distance to the proposed S2GF project on the
13 Canadian side of the border.

14 SG2=s application does not address those issues.

15
16
17 **What are your conclusions about the proposed project?**

18
19 My conclusions are that the S2GF project:

- 20
21 - Has some site limitations;
- 22
23 - Raises questions about whether it is in the public interest;

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- If needed, would be more appropriately located at or near an electrical load centre such as Seattle/Tacoma, Southern California or in Alberta;
- Not explicitly defined from a permit compliance perspective. Specific guarantees from SE2 or a refined project definition are needed;
- Conflicts with the initiatives of the Canadian government agencies for management of the Lower Fraser Valley airshed and air quality in Canada;
- Based upon criteria published by the Canadian government agencies, has the potential for adverse effects on public health and the environment;
- Serves to raise concerns about visibility of important vistas from the City of Abbotsford and elsewhere in the Lower Fraser Valley without adequately addressing those concerns.

In your opinion, are natural gas-fired combined cycle projects appropriate?

The use of modern state-of-the-art combined cycle power plants burning natural gas to generate electrical power is recognized. The economic advantage is being able to put a thermally efficient power plant at or near the centre of the electrical load and thereby avoid long transmission lines from other potential power sources such as hydroelectric projects to the electrical load centre. The deferral of James Bay project by Hydro Quebec and the Gull Island (near Churchill Falls) project by Quebec and

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EXHIBIT PGS -T

1 Newfoundland in favour of local natural gas fired projects in the United States, are
2 examples of this economic reality.

3
4 Natural gas can be delivered by pipeline directly to a power plant location, thereby
5 avoiding the additional electrical transmission facilities and losses in electrical power
6 from transmission of that power over long distances. Site selection can also be made
7 in some cases to optimize thermal efficiency through cogeneration.

8 **The applicant has made various comparisons between S2GF and BC Hydro's Burrard**
9 **Plant. Can you explain the difference?**

10
11 The proposed S2GF plant would burn natural gas with diesel oil as a backup fuel. The
12 Burrard Plant is restricted to the use of natural gas only.

13
14 S2GF would be a combined cycle power plant (gas turbine and heat recovery boiler).

15 The Burrard Plant has boilers only and not gas turbines. S2GF would have a rated
16 capacity of 660 MW while the Burrard Plant has about a 45% greater capacity at a total
17 of 962.5 MW. S2GF would be new while the Burrard Plant started production in 1962
18 and was completed by about 1975. The Burrard Plant was originally designed to burn
19 residual oil and natural gas but has used natural gas only since about 1978. The
20 Burrard Plant was modernized in the mid to late 1990s to have selective catalytic
21 reduction (SCR) and reduced NO_x emissions. That plant is located within or near to
22 the most populated area of British Columbia (GVRD) and while providing system
23 wide backup, is able to help provide the needs of that load centre.

24 Air emission concentrations from gas turbines, like S2GF, are frequently expressed at

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1 an oxygen (O₂) concentration of 15%. Boilers, and in the specific case of the Burrard
2 Plant, have their emission limits expressed at 3% O₂. When an emission concentration
3 limit is converted from 3% O₂ to 15% O₂, the numerical value of the concentration
4 decreases by about three times.

5
6 The total NO_x emissions in the application from S2GF are 236 t/yr, which may be
7 about 153 to 159 t/yr when the proposed changes are incorporated by SE2 into their
8 application. The Burrard Plant has a NO_x emissions cap of 750 t/yr. The proposed
9 NO_x limit for S2GF is 2 ppm when corrected to 15% O₂. The NO_x limit for the
10 Burrard Plant is 35 mg/m³ @ 3% O₂ or 6 ppm in comparable units to S2GF as a 24-
11 hour average. For a 1 hour average, the limit is 52 mg/sdm³ or 9 ppm in comparable
12 units to the S2GF project. However, the ammonia slip for S2GF is 10 ppm while the
13 equivalent for the Burrard plant is 3.3 ppm (7 mg/m³ @ 3% O₂). (All values for the
14 Burrard Plant are based upon GVRD=s permit amendment of March 18, 1994).

15
16 Given the age of the Burrard Plant, those emission limits are low. The GVRD took
17 international, including Canada/U.S., issues into account when the permit limits for
18 the Burrard Plant were made more restrictive. The proposed S2GF project is for a new
19 plant where lower emission limits would be reasonably expected to apply.

20
21 **Are there site limitations for the S2GF project?**

22
23 The proponent of the S2GF project notes in the application that this project will serve
24 the general Amarket@. That market is not realistically and primarily Whatcom County
25 which we understand has access to an adequate supply of electrical power. As the

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EXHIBIT PGS -T

1 proponent has noted on p. I-4 of their application, the market plan for a merchant plant
2 would be to sell power to the highest bidder on a daily basis. As also noted on that
3 page, the applicant expects substantial transmission upgrades from utilities using
4 the S2GF power. However, the cumulative impact of those upgrades is not stated.
5 While marketing plans are proprietary, it is likely Alberta as well as load centres in
6 Washington State and beyond are the intended users of that power.

7 On p. I-1, the application states the SE2 will sell the power produced by SGF
8 wherever there is a market to purchase the power and that ASE2 or power purchasers
9 may obtain transmission rights and move the power to purchasers located anywhere
10 throughout the West. On p. I-3, SE2 notes in terms of access to BC Hydro's
11 Clayburn substation that this is the nearest connection point to the main electrical
12 grid that services British Columbia, Alberta and the eleven western states in the United
13 States. The integrated utility transmission (grid) system in Canada and the United
14 States allows for power to be provided to areas as distant as Alberta and Southern
15 California.

16 Therefore, it has not been demonstrated that S2GF is near a major electrical load
17 centre. Therefore S2GF does not fit the model of putting this type of plant near a
18 load centre. The proposed Frederickson project near Tacoma is perhaps a better
19 example of that model for siting purposes.

20
21 Combined cycle power plants may be more thermally efficient if located near the load
22 centre if cogeneration (use of the otherwise unavailable energy from low pressure
23 steam at an adjacent industrial facility) is a viable option. The S2GF site does not

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1 appear to offer that option.

2
3 The site selection (Section 9.1.2) of the application did not address locations close to
4 the apparent load centres (e.g., Alberta, Seattle, Tacoma or possibly Southern
5 California). The City of Abbotsford and, by resolution, the Fraser Valley Regional
6 District (FVRD) have recognized that this project is not warranted to provide power
7 for load use. In this case, Canada supplies the natural gas, diesel oil, and, based upon
8 SE2=s application, gets the transmission line, effluent and air emissions in return.
9 This is an export of a non-renewable resource without value added and with an
10 expected negative effect on the Canadian environment.

11 Use of natural gas as a necessary fuel substitution at an existing industrial or other
12 facility to improve air quality in areas already significantly compromised is an
13 appropriate air management strategy. The proposed S2GF project does not meet that
14 criterion.

15
16 The S2GF site is an area with a limited water availability. The Province of British
17 Columbia would have to make a decision under *The Water Protection Act* for water
18 to be exported by pipeline (or by other bulk means). The SE2 applicant has
19 acknowledged that the Province has not approved that export for the purposes of this
20 project. Given the limited water availability, alternate measures were required in plant
21 design which may not have been required at locations where adequate water supplies
22 were available. As noted on p. I-5 of the January 2000 application, the revised project
23 has had a water reduction from 2,800 gallons per minute (gpm) to 653 gpm, a
24 reduction of more than 75%. An appropriate site with an available water supply

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would reasonably not have to take those additional measures.

On pages 1.6-7 and 1.6-8, Section 1.6.2.7, the applicant notes that, for Canada, there is in effect a free trade agreement requiring national treatment for trade in natural gas.

Applications for such importation generally are granted without modification or delay. While there are advantages or disadvantages to free trade, it would be reasonable to anticipate some reticence on the part of the provincial government for water export to an industrial project in the United States and thereby run the risk of treating water as another tradable commodity. Mutual public interest would have to be confirmed for such an agreement to proceed.

Does it make any difference if the S2GF project were in the United States or Canada?

Environmental receptors (e.g., vegetation, the human being) do not know whether an air contaminant comes from the United States or Canada. If the project was located in Canada, similar types of environmental issues would arise.

Locating a project close to an international border area creates additional questions which need to be addressed through agreements and cooperation with the appropriate governmental jurisdictions. At this time, the review by the Canadian agencies is currently underway but not yet complete.

Why may the project not be in the public interest?

The Lower Fraser Valley is an environmentally sensitive area with an acknowledged

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1 atmospheric visibility problem. Any project which serves to worsen that visibility or
2 create otherwise avoidable environmental effects but without any significant benefit
3 to the residents of that airshed is not in the public interest.

4
5 Washington State and the Province of British Columbia, the United States and Canada
6 have had a long-term record of cooperation. Both the Province and the State have
7 made efforts to strengthen that relationship through Memoranda of Understanding and
8 cooperation between the government agencies with a responsibility to prevent air
9 pollution on their respective sides of the border. Since the successful resolution of, in
10 air pollution terms, a historical air quality issue in the Columbia River Valley, it is
11 important that this environmental cooperation continue such that sustainable
12 development occurs within the Georgia Basin and that the concerns of the respective
13 jurisdictions or their citizens are fully addressed in the Lower Fraser Valley.

14
15 On April 18, 2000, SE2 sent a letter to the Ministry of Environment, Lands and Parks
16 (MELP) with an attachment which addressed air quality. On pp. 16 and 17 of the
17 attachments, SE2 offered to address emissions related to PSD on the British Columbia
18 side of the Lower Fraser Valley. On May 2, 2000, the City of Abbotsford also
19 accepted that agreement as noted on p. 7 of their letter to EFSEC.

20
21 On p. 6.1-41 of SE2=s application, it is noted that while the population of Whatcom
22 County increased by 50% from 1979 to 1998, the population increase for the City of
23 Sumas was relatively small (114 residents between 1990 and 1998). Given the
24 principle noted in the preceding paragraph, it would be appropriate to recognize the
25 population increase in the City of Abbotsford and the Fraser Valley Regional District

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1 if not for the Lower Fraser Valley as a whole. That population increase and the
2 expected future should also be recognized.

3
4 BC Stats reports that the City of Abbotsford had a population of 48,752 in 1979
5 (Abbotsford and Matsqui) and in 1998, an estimated population of 113,375 (133%
6 increase). Chilliwack had a corresponding 65% increase from 39,071 in 1979 to an
7 estimated 64,484 in 1998.

8 **Have the principles of the State Environmental Policy Act (SEPA) been addressed?**

9
10 No, cumulative effects have not been fully considered. Worst case analyses have not
11 been conducted on the environment or health effects to support the DEIS or the
12 application and the effects on the environment in Canada have not been fully
13 addressed.

14 **What is your concern about cumulative environmental effects?**

15 A principle of SEPA is to address Apotential direct, indirect and cumulative impacts@.
16 From a cumulative effects perspective, a basic premise of the *British*
17 *Columbia/Washington Environmental Initiative* and the *Georgia Basin Ecosystem*
18 *Initiative* is to have sustainable development with an expected increasing population.
19 Cumulative effects need to address the expected population growth of the region on
20 both sides of the border and the effects of that population change on air emissions and
21 air quality .

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23 In addition, natural gas is described as a clean fuel, cleaner than alternate fuels such

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1 as coal by the applicant (SE2). That is certainly the case for processed natural gas.
2 However, from an air emissions perspective, the upstream oil and gas industry is
3 British Columbia=s predominant emitter of SO₂ (57%). Together with the oil sands,
4 the natural gas and oil industries account for 72% of Alberta=s SO₂ emissions. Since
5 comparisons have been made to coal-fired power plants or existing thermal plants by
6 the applicant, then cumulative effects including life cycle analyses should have also
7 been evaluated by the applicant if SE2=s intent is to illustrate the merits of the
8 proposed S2GF project over the use of alternative fuels.

9 **What are the economic concerns?**

10
11 Using the proponent=s application and other published data, the proposed project will
12 create few jobs and may require a major tax subsidy to achieve its objective.

13
14 As noted on pp. 12/13 of the City of Abbotsford=s response to the DEIS, Governor
15 Locke vetoed Substitute Senate Bill No. 6062 on March 31, 2000 which he viewed as
16 an inappropriate tax exemption for this project. While the Governor was careful not
17 to consider the broader merits of the S2GF project, it raises the question that if this
18 proposed project is economically viable and environmentally appropriate, why
19 subsidize it? It would be more appropriate to subsidize wood waste to energy projects
20 which are more costly to build and operate but have significant emission offset and
21 environmental benefits.
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1 **Related to the economic concerns, what are the economic incentives or cumulative effects**
2 **to the proposed project on the Canadian side of the border?**

3
4 The draft EIS should address worst case scenarios. However, the proponent has not
5 delineated where the electrical power is to be used other than references to Alberta and
6 areas capable of direct (SE2) or indirect distribution within the western United States.
7 A reasonable worst case analysis would be:

- 8 - BC Hydro will receive the electrical power from the proposed S2GF project at its
9 Clayburn substation located roughly north of downtown Abbotsford;
- 10
11 - BC Hydro, as a prudent and responsible operator of an electrical utility, recognizes
12 that electrical interconnections are important to its operation as part of the
13 domestic/international grid. BC Hydro will likely accept that power in accordance
14 with established tariffs and development costs (if the S2GF project and associated
15 transmission line receive the relevant approvals);
- 16
17 - BC Hydro has stated that it has no interest in purchasing firm power from the
18 S2GF project. However, BC Hydro or their export subsidiary Powerex, as a
19 prudent operator, may elect to take interruptible energy if that approach is in its
20 economic interest or to maximize the rate of return to its shareholder (the Province
21 of British Columbia);
- 22 - The availability of this non-firm power source gives BC Hydro increased
23 opportunity to use the S2GF as an Ainsurance@ backup while drawing down the
24 hydroelectric reservoirs to supply electrical power to markets such as Alberta or

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California;

- Since S2GF would be more thermally efficient than BC Hydro=s Burrard Thermal Plant, it provides an incentive for BC Hydro to repower (increase the capacity by installing gas turbines upstream of the boilers) at Burrard to make that plant more economically competitive. Since fuel costs represent the major operating costs for thermal plants, Burrard=s longer-term economic viability will be based, in part, upon thermal efficiency. The original application for the S2GF project recognized this competitiveness issue (p. 6.1-44);
- Given the additional thermal power capacity, more emissions could actually occur in the LFV as a substitute for hydroelectric power sent elsewhere;
- SE2 will be able to operate in colder winter weather when natural gas availability is curtailed due to pipeline volume or other delivery constraints. The Burrard Plant does not have that capability. If BC Hydro concurrently faced a power need due to a shortage of natural gas and a weather related transmission line failure, they would need to look at alternate sources of supply including S2GF.
- BC Hydro will collect the Awheeling@ charge for transmission of electrical power from S2GF;
- BC Hydro gets some of the benefits of the S2GF project without having to make the capital investment or commit to contracts for firm power from S2GF.

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EXHIBIT PGs -T

1 On p. I-6, SE2 states that the liquid fuel backup allows it to release its (natural gas)
2 pipeline volume to other commercial uses. It would be appropriate for SE2 to clarify
3 whether they plan to use firm natural gas contracts and charge for this volume release
4 or some form of interruptible contract to reduce the cost of natural gas.

5 **Has the proponent demonstrated how they would comply with the proposed emission**
6 **limits?**
7

8 No. The S2GF proponent has proposed emission limits for NO_x without defining how
9 compliance will be determined. For example, the NO_x limit of 3 ppm was qualified
10 by the proponent when MELP requested a 1 hour averaging time (p. 13, of S2GF
11 response on 18 April 2000). No clarification was provided by the applicant on the
12 interpretation of the 2 ppm NO_x limit.

13
14 The proponent's announcement on May 31st of a 2 ppm_v emission limit for NO_x did
15 not state any potential effect on other contaminants. The announcement did not
16 address the effect on ammonia slip (emissions) which could increase if more ammonia
17 was used. Alternately, a larger selective catalytic reduction (SCR) section or some
18 other approach may be used. However, the project definition (application) has not
19 been modified to explain the process changes to achieve the new discharge limits or
20 to delineate the emissions (e.g., potential to emit).

21 The proponent has not provided specifics on how compliance with the measurement
22 method is to be determined. A commitment is required by the applicant (SE2) that
23 they are prepared to accept the time limits in 40 CFR 60.8(a) for meeting those
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1 emission limits (i.e., within 60 days after achieving the maximum production rate but
2 not later than 180 days after start up). For NO_x, this includes a 1 hour averaging
3 period.

4 **Has the proponent resolved the issues with the government of British Columbia, the**
5 **Greater Vancouver Regional District and the Canadian Government?**

6 No. At the time of the preparation of this evidence, the review by the Canadian
7 government agencies was not completed.

8
9 On p. 6.1-2 of the SE2 application, it states that ATotal air pollutant
10 concentrations...when the maximum predicted concentrations are added to the highest
11 values measured at Abbotsford@. However, the highest values measured at Abbotsford
12 were not used for that comparison.

13
14 SE2=s project definition and the DEIS are still evolving. It is clear that the applicant
15 assumed a lower background level for particulate (PM₁₀) and at the wrong location.
16 Environment Canada and MELP have both noted this problem and that light wind
17 speeds, not the high wind speeds suggested by the applicant, were associated with the
18 highest PM₁₀ measurement (73 µg/m³). However, it is currently unknown how the
19 proponent intends to remedy this issue through a revised determination of background
20 air quality, to demonstrate that air quality in the LFV airshed will not be compromised
21 by this project and that the proposed S2GF project will neither cause nor contribute to
22 exceedance of the PM₁₀ air quality objective on the Canadian side of the airshed.

23 The proponent has acknowledged in their application that PM₁₀ concentrations have

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1 been measured in the Lower Fraser Valley at levels numerically greater than the
2 GVRD=s published objective (50 ug/m3, 24-hour average). However, the proponent
3 explains that their increment is only a 7 µg/m³ further PM₁₀ increment (24-hour
4 average). The obligation rests with the proponent to explain both their contribution
5 to primary and secondary particulate and the consequential effect on visibility. The
6 Canadian Federal Ministers of Health and Environment have served notice of their
7 intention to declare PM₁₀ as a toxic substance. If the rationales for air quality by the
8 federal, provincial and GVRD government agencies are to be accepted, then there is
9 an existing effect on public health in this airshed.

10 The proponent plans to market the power. However, the applicant has not
11 demonstrated the effect of the rising cost of natural gas and how the wheeling cost
12 through British Columbia will affect the marketability of electrical power from this
13 proposed project. Projects closer to the load centre(s) may well be more cost-effective.

14
15 Under EFSEC, the procedures developed by the State of Washington govern for
16 activities within Washington State. However the approach by EFSEC should
17 recognize the Memoranda of Understanding between Washington State and the
18 Province of British Columbia and other relevant protocols. The *Environmental*
19 *Cooperation Agreement Between the Province of British Columbia and the State of*
20 *Washington* was signed by the then Premier and Governor on May 7, 1992. In
21 Washington State, the proposed S2GF project is categorized by the proponent under
22 PSD rules as a major emission source. The provincial analogy is an Air contaminant@
23 under the *Waste Management Act*. An Air contaminant@ includes a substance which
24 interferes with or is capable of interfering with visibility as well as being capable of

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injuring health or any life form or capable of damaging the environment. Established public concerns include visibility, protection of public health and the environment.

How does PSD fit with Canadian and provincial policy?

The proponent has followed a Acookbook@ approach to PSD review and environmental assessment. However, as noted in both the Environment Canada and MELP letters of May 2, 2000, the proponent has not been able to fully address the concerns of the Canadian agencies (Environment Canada, and MELP). The Canadian environmental agencies have suggested that the PSD Acookbook@ approach does not lend itself to a review under the Canadian democratic system where more flexibility is allowed. As such, the Canadian public has not seen their questions adequately addressed in an understandable way. That population would be the recipient of the air emissions from the proposed S2GF project.

However, the U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards together with the Air & Waste Management Association, published a *New Source Review Workshop Manual, Prevention of Significant Deterioration and Nonattainment Area Permitting* document (draft, October 1990). That document notes in part D (Additional Impact Analysis) that an additional impact analysis must still be conducted. The expectation was that vegetation with any commercial or recreational value be noted and that sensitive vegetation species, including agricultural crops, be evaluated. Visibility, distinct from a Class I visibility analysis, should be conducted. The proponent did not conduct this for the application.

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1 In effect, the Aflexibility@ requested by the Canadian agencies is consistent with the
2 type of PSD review requirements contemplated by the U.S. EPA. The PSD concept
3 incorporates the equivalent of the Ministry of Environment, Lands and Parks= and the
4 Greater Vancouver Regional District=s Aflexibility@ requirements.

5 **What is the effect on visibility?**

6
7 The public is concerned about visibility, which is an acknowledged issue in the Lower
8 Fraser Valley. Opportunities to view scenic vistas are restricted naturally by weather
9 conditions (e.g., rain, cloud cover and fog) thereby limiting the days when vistas such
10 as a view from the City of Abbotsford to Mount Baker can be observed. SE2
11 effectively recognizes this point on p. 2.1-4 of the application where precipitation rates
12 for Abbotsford and fog are addressed.

13
14 With good visibility under those circumstances, any small addition of emissions to the
15 airshed could more significantly deteriorate that visibility. Small amounts of
16 particulate, nitrogen dioxide, or secondary aerosol formation can adversely affect
17 visibility. The visibility concerns and the socio-economic consequences for the City
18 of Abbotsford and environs have not been adequately addressed by the proponent.

19 Residents on the Canadian side of the Lower Fraser Valley have done their part to
20 address air emissions through measures such as taking their cars and light trucks
21 through a mandatory emissions inspection by AirCare. The visibility concerns in the
22 Lower Fraser Valley are still unacceptable to a large segment of that population, in
23 both the lower and upper portions of the Valley. Cumulative effects of the S2GF

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1 project, which is not needed in the LFV for power generation purposes, will not help
2 to resolve that problem. The Canadian environmental agencies have not yet been able
3 to determine effects on vistas of the S2GF project from the data provided by the
4 proponent.

5
6 It is admittedly difficult to express visibility effects in a form easily understood by the
7 public and by administrative decision makers. Visibility for suburban and nonurban
8 areas of the United States in the Pacific Northwest were estimated for the 1970=s (in
9 1990) at about 50 to 100 km (median standard visual range). Other data showed
10 greater ranges. The Canadian environmental agencies recognize that documentation
11 of visibility in the LFV needs to be improved and have taken further measures to
12 achieve that objective. However, the Canadian public views the current visibility as
13 unacceptable for the Lower Fraser Valley with reasonable justification. An important
14 air quality initiative is to incorporate a visibility goal into the forthcoming *Greater*
15 *Vancouver - Air Quality Strategic Plan*. Otherwise, uncertainty on visibility issues
16 will remain for the public and industry on both sides of the border.

17
18 Having made the above observations, both the DEIS and the application need to be
19 more definitive about local (non-Class I area) visibility in the Fraser Valley Regional
20 District and address the current visibility levels. That is a reasonable requirement of
21 the PSD process.

22
23 **What about greenhouse gases?**

24
25 SE2=s *Greenhouse Gas Offset Strategies Plan Sumas 2 Generation Facility*

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acknowledges carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) as greenhouse gases, but only addresses the first two. Given that N₂O has 310 times the global warming potential of CO₂, small quantities of N₂O emissions can be significant. The applicant's assessment is therefore deficient in this regard.

The proponent, SE2, refers to the lack of a greenhouse gas plan from the B.C. government. To be complete, the Province issued a *British Columbia Greenhouse Gas Action Plan* in November 1995 and has been a driving force in the development of a pilot greenhouse gas emission reduction trading pilot program.

Please comment on smog.

If the Canadian government's analyses of smog are to be accepted, smog levels are the cause of many deaths in Canada including the Lower Fraser Valley. After the concerns of the Windsor-Quebec City corridor, the Lower Fraser Valley is considered to have the greatest smog concern in Canada. The concerns of Canada's Environment Commissioner need to be addressed by the applicant as part of their evaluation for the proposed S2GF project. (*Report of the Commissioner of the Environment and Sustainable Development - 2000*).

In fairness to both the applicant and residents of the Lower Fraser Valley, it is imperative that the issue of the potential health effects of emissions from the proposed S2GF project on public health be expeditiously addressed by the Canadian government agencies. If the proposed Canadian criteria are supportable, there has been adequate time for initial conclusions to be drawn and published by the two senior levels of

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1 government on the health effects of both smog and particulates.

2
3 **What is the concern over agricultural land?**

4
5 The City of Abbotsford has the highest value farm gate receipts in the Province of
6 British Columbia. However the socio-economic analysis did not evaluate the
7 cumulative effect of this project on those crops where crop losses due to prior Air
8 pollution@ have already been determined.

9 One study provided by Agriculture and Agri-Food Canada showed minimal losses for
10 orchardgrass but an 8% loss for strawberry crops due to ozone (smog). However, the
11 applicant has not addressed the effects of the proposed S2GF project on sensitive
12 agricultural crops within the City of Abbotsford and environs. Sensitive species
13 should be addressed.

14
15 **Have you reviewed the letter from SE2 to MELP dated May 24, 2000?**

16 Yes.

17
18 **What is your view of the feasibility of that approach?**

19
20 The uncertainty over the NO_x emission limit for permit compliance purposes was
21 previously addressed in this pre-filed testimony. However, if the 2 ppm NO_x limit is
22 consistently achieved, it will lower the anticipated emission rate. Assuming that the
23 2 ppm limit becomes enforceable as a permit limit (1 hour average), it represents the

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1 lowest achievable emission rate (LAER). The offer to cut the number of days using
2 oil to an average of 10 days per year averaged over a 10 year time period would also
3 represent a decrease in emissions if that limitation were also incorporated into a
4 permit.

5
6 With respect to the question of visibility, it was stated in the Greater Vancouver
7 Regional District's *Air Quality Management Plan* (February 1994, p. 8-11) that a
8 strategy was not in place to address visibility. The REgional VIsibility EXperimental
9 ASessment in the Lower Fraser Valley (REVEAL) program by the federal, provincial
10 and regional (GVRD) governments was intended to help address that visibility
11 problem. A FVRD initiative has been planned to address monitoring visibility and air
12 quality at significant elevations above the valley floor on Sumas Mountain. The
13 FVRD and the proposed SE2 initiatives would both serve to measure those levels.

14 An important factor contributing to the quality of life in the Lower Fraser Valley is the
15 clarity of vistas, including Mount Baker, when non-precipitation and low cloud cover
16 days (i.e., good visibility days) occur. That visibility and the view of the mountains
17 contribute to a Pacific Northwest/west coast lifestyle. Relatively small amounts of
18 aerosols (particulate) or gases (nitrogen dioxide) can contribute to a brown haze and
19 visibility deterioration.

20 With respect to BC Hydro, the Burrard Plant was an existing facility constructed in the
21 1960=s and upgraded to 1990=s emission standards that would be required for
22 southern California. There are limitations on thermal plants, like older motor vehicles,
23 on the emission reductions achievable by retrofits. If an air quality episode were to

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1 occur, stationary emission sources such as BC Hydro=s Burrard Plant and S2GF would
2 need to be curtailed concurrently and not in sequence as proposed by SE2. In addition
3 to the proponent=s proposal for June, July and August, the time period for potential
4 curtailments would extend through the warmer portion of the year and should therefore
5 also include September.

6 SE2 proposes emissions curtailment from S2GF under Aadverse air quality episode@
7 conditions. An Aadverse air quality episode@ would need to be defined and not be an
8 Aepisode@ in the classic Donora, Pennsylvania or London Smog cases. Rather, it
9 should be patterned for ozone on the basis of the proposed Canada-Wide Standards,
10 a level with a statistically similar basis to that used by the U.S. EPA, but at a slightly
11 more restrictive limit (65 vs 80 parts per billion ozone as an 8-hour average).

12 For particulate, an appropriate level should be established for the airshed by the U.S.
13 EPA, WDOE, NWAPA, Environment Canada, MELP, GVRD and the FVRD. That
14 step would need to reconcile the large disparity in the application of ambient PM₁₀
15 and/or PM_{2.5} standards/objectives for environmental assessment and episode purposes
16 on the two sides of the border. This point was identified in the response to the DEIS
17 submitted by the City of Abbotsford to EFSEC on May 2, 2000.

18 The Aadverse air quality episode@ should be based on meteorological forecasts as air
19 quality levels rise, not on measured levels after they occur.

20 SE2 asked MELP to agree to certain conditions related to the supply of electrical
21 power to SE2 by BC Hydro. Realistically, MELP cannot specify business matters to

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1 BC Hydro. Any negotiation on replacement power supply should be directly between
2 BC Hydro/Powerex and SE2. SE2 may need a backup power agreement with another
3 electrical power generator in any event if SE2 were to offer firm power to its
4 customers. That condition is a commercial matter between SE2, BC Hydro or another
5 power source provider, not a matter for MELP.

6 SE2 has offered emission offsets for NO_x, CO and PM₁₀. While an offset is not
7 defined in their letter, an offset is normally a reduction of emissions from a non-S2GF
8 source to the level of the emissions from the proposed source, in this case S2GF.
9 While the offsets proposed by SE2 are likely achievable for particulate (PM₁₀) in the
10 area between Mission and Chilliwack due to the small amount of particulate emissions
11 expected from S2GF, nitrogen oxides (NO_x) offsets will be more difficult to achieve
12 given the low NO_x emissions for the FVRD (5,850 t/yr in 1998 with 84.1% from motor
13 vehicles and only 4.6% or 268 t/yr from point sources and 11.3% or 660 t/yr from area
14 sources). The emissions from all point sources over the entire FVRD, not just Mission
15 to Chilliwack portion suggested by the applicant, are only moderately greater than the
16 NO_x emissions expected from the S2GF project. While SE2's goal of Azero impact
17 for NO_x needs to be defined, a total NO_x offset from the SE2 project would likely
18 have to come from more westerly emission sources within the GVRD.

19 The greenhouse gas emission strategy by SE2 is a start given the lack of regulatory
20 requirements. However, the cost of that program would likely be much lower than
21 emissions trading to offset the greenhouse gas emission increases from S2GF. It
22 would be appropriate for SE2 to delineate the current cost of the future risk to the
23 project should the Kyoto Protocol be implemented.

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Are there broader issues with respect to this proposal?

Yes. At a minimum SE2 has provided a case study of air quality issues within the Lower Fraser Valley (LFV). Their application has served to identify both the strengths and weaknesses of the air management planning processes in the LFV. While flexibility is important, the air management planning process on the Canadian side of the LFV does not have the necessary air management strategies and well-delineated procedures (e.g., similar to state implementation plans or prevention of significant deterioration). There is a need to review those procedures to allow the public, political leaders and industry on both sides of the border to cost-effectively address air quality and other environmental issues. That review is currently underway with the *Greater Vancouver - Fraser Valley Air Quality Strategic Plan* and other measures.

END OF DIRECT TESTIMONY OF WITNESS

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